

**WHAT WE CLAIM IS:**

1. A control system for a rock crusher, said control system being adapted to control a cascade ratio of said crusher, wherein a portion of material entering the crusher is placed into cascade, and the remainder of said material entering the crusher is supplied to a crusher rotor,  
  
the control system including a processing means, said processing means being adapted to receive a throughput signal from at least one throughput sensor,  
  
said processing means also being adapted to transmit at least one control signal to at least one control mechanism of the crusher,  
  
wherein at least one control signal or signals are transmitted to each control mechanism to adjust the amount of material entering the crusher rotor to provide a specific cascade ratio for said crusher in response to a variable throughput for said crusher.
2. A control system as claimed in claim 1 wherein the rock crusher is a vertical shaft impact crusher.
3. A control system as claimed in either claim 1 or claim 2 wherein at least one control signal is transmitted to at least one control mechanism for a rotor gate for the crusher.
4. A control system as claimed in any one of claims 1 to 3 wherein the control signal is transmitted to a control mechanism for a crusher feed-in mechanism.
5. A control system as claimed in either claim 3 or claim 4 wherein the control mechanism has variable settings.

6. A control system as claimed in any one of claims 1 to 5 wherein the cascade ratio is defined as the ratio of amount of material passing through the crusher rotor to the amount of material cascading past the rotor concurrently.
7. A control system as claimed in claim 6 where the cascade ratio is calculated with reference to weight of material passing through the crusher
8. A control system as claimed in either claim 6 or claim 7 where the cascade ratio is calculated with reference to the volume of material passing through the crusher
9. A control system as claimed in any one of claims 1 to 8 where the amount of material supplied to the crusher varies over time.
10. A control system as claimed in any one of the claims 1 to 9 wherein the processing means includes a programmable logic device.
11. A control system as claimed in claim 10 wherein the programmable logic device is a programmable logic controller.
12. A control system as claimed in either claim 10 or claim 11 wherein the programmable logic device is adapted to receive specific or target cascade ratio information from a user of the control system.
13. A control system as claimed in any one of claims 10 to 12 wherein the programmable logic device is adapted to receive a throughput signal from at least one throughput sensor.
14. A control system as claimed in claim 13 wherein the throughput sensor is provided throughput signal through at least one belt weigher.
15. A control system as claimed in any of claims 10 to 14 wherein the

programmable logic controller is adapted to transmit at least one control signal to one or more control systems of the rock crusher.

16. A control system as claimed in any one of claims 1 to 15 which includes an element which is adapted to display information to the user of the crusher.
17. A control system as claimed in claim 16 wherein the element adapted to display information is a display panel.
18. A control system as claimed in any one of claims 1 to 17 adapted to receive a power consumption signal from drive elements or motors associated with the crusher.
19. A control system as claimed in claim 18 wherein the power consumption signal is a motor current value for motors used to drive the rotor.
20. A method of calibrating a control system as claimed in any one of the previous claims, characterised by the steps of:
  - (i) fixing the settings of the crusher's control mechanism at known positions or values, and
  - (ii) observing the cascade ratio for the crush at varying throughput values, and
  - (iii) resetting the settings of the crusher's control mechanism to match the actual cascade ratio observed.
21. A control software for a rock crusher control system, wherein a portion of material entering the crusher is placed into cascade and the remainder of said material entering the crusher is supplied to the crusher rotor, said software being said control software being adapted to execute the steps of;

- (i) receiving target cascade ratio information, and
  - (ii) receiving a throughput signal indicative of the current crusher throughput, and
  - (iii) determining changes to be made in the settings of the rock crusher's control mechanism or mechanisms to achieve the target cascade ratio, and
  - (iv) transmitting at least one control signal to a control mechanism to implement the changes required in the settings of said control mechanism or mechanisms.
22. A control system substantially as herein before described and with reference to Figure 1.
22. Control software substantially as herein before described and with reference to Figure 2.